

Micro-Analytical Data of Au Mineralization at Atud Gold Deposit, Eastern Desert, Egypt

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Abstract : Atud gold deposits located at the central part of the Egyptian Eastern Desert of Egypt. It represents the vein-type gold mineralization at the Arabian-Nubian Shield in North Africa. Furthermore, this Au mineralization was closely associated with intense hydrothermal alteration haloes along the NW-SE brittle-ductile shear zone at the mined area. This study reports new data about the mineral chemistry of the hydrothermal and metamorphic minerals as well as the geothermobarometry of the metamorphism and determines the paragenetic interrelationship between Au-bearing sulfides and gangue minerals in Atud gold mine by using the electron microprobe analyses (EMPA). These analyses revealed that the ore minerals associated with gold mineralization are arsenopyrite, pyrite, chalcopyrite, sphalerite, pyrrhotite, tetrahedrite and gersdorffite-cobaltite. Also, the gold is highly associated with arsenopyrite and As-bearing pyrite as well as sphalerite with an average ~70 wt.% Au (+26 wt.% Ag) whereas it occurred either as disseminated grains or along microfractures of arsenopyrite and pyrite in altered wallrocks and mineralized quartz veins. Arsenopyrite occurs as individual rhombic or prismatic zoned grains disseminated in the quartz veins and wallrock and is intergrown with euhedral arsenian pyrite (with ~2 atom % As). Pyrite is As-bearing pyrite that occurs as disseminated subhedral or anhedral zoned grains replacing by chalcopyrite in some samples. Inclusions of sphalerite and pyrrhotite are common in the large pyrite grains. Secondary minerals such as sericite, calcite, chlorite and albite are disseminated either in altered wallrocks or in quartz veins. Sericite is the main secondary and alteration mineral associated with Au-bearing sulfides and calcite. Electron microprobe data of the sericite show that its muscovite component is high in all analyzed flakes (XMs= an average 0.89) and the phengite content (Mg+Fe a.p.f.u.) varies from 0.10 to 0.55 and from 0.13 to 0.29 in wallrocks and mineralized veins respectively. Carbonate occurs either as thin veinlets or disseminated grains in the mineralized quartz vein and/or the wallrocks. It has higher amount of calcite (CaCO₃) and low amount of MgCO₃ as well as FeCO₃ in the wallrocks relative to the quartz veins. Chlorite flakes are associated with arsenopyrite and their electron probe data revealed that they are generally Fe-rich composition (FeO 20.64-20.10 wt.%) and their composition is clinocllore either pycnochlorite or ripidolite with Al (iv) = 2.30-2.36 pfu and 2.41-2.51 pfu and with narrow range of estimated formation temperatures are (289-295°C) and (301-312°C) for pycnochlorite and ripidolite respectively. Albite is accompanied with chlorite with an Ab content is high in all analyzed samples (Ab= 95.08-99.20).

Keywords : micro-analytical data, mineral chemistry, EMPA, Atud gold deposit, Egypt

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